

OBSERVATIONS
ON
MILLING
Broad and Narrow
CLOTH, &c.

SHEWING

- I. The *many destructive Errors* that attend the common Method of Milling, and Reading or Tighting of CLOTH, during its Milling. And,
- II. The *many Advantages* that accrue, instead thereof, from the Use of a *new INSTRUMENT*, called a REGULATOR.

To which is annexed,

A CERTIFICATE signed by several of the *most eminent CLOTHIERS* in the *Superfine Trade*.

By RICHARD BROOKS, *Clothier*,
Inventor of the said REGULATOR, and
Patentee, at the *Devizes*, in the County
of *Wilts*.

L O N D O N :

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T H E
P R E F A C E.

THE Woollen Manufacture is generally allow'd to be the chief Support of the English Nation : And it is universally acknowledged, that it is brought to a greater Perfection in this, than in any other Kingdom.

It was my Lot to be brought up in the Clothing Trade, viz. in making Druggets and German Serges ; and as these Trades declined, I was willing to try what I could do in making superfine narrow Cloth, in a different Manner from any that had been already made ; and I was determin'd to do it to the greatest Perfection I was able. To what Perfection I have made it ; I leave to those Persons who have

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iv The P R E F A C E.

bought it of me, to give it the Character it deserves.

At length I was willing to make some superfine broad Cloth, as well as narrow. I was not unacquainted, but well knew, that from new Schemes would arise new Difficulties ; and that probably I might, in this new Trade, find room for several Improvements, as I had done in the several Trades, I had been concern'd in before.

At first indeed, I thought an Age would be too short a Time for rectifying the Errors which have been run into by the Manufacturers of Cloth ; but I am now of a quite different Opinion, and that a much less Time will do it. And if the Gentlemen who are concerned in the Clothing Trade, will maturely consider, and strictly enquire into the Nature of every Operation throughout the whole
Manu-

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Manufacture, *they will soon see it necessary to alter many Methods which are now in Use. — I speak this not boastingly: For I have not only been at a great Expense of Money and Time, but have also taken a great deal of Pains to make myself capable of giving a rational Account of the Manufacturing fine broad and narrow Cloth. I make no Doubt, but that if some other Persons had taken the same Pains, and been at the like Expense, they might have been able to render a much better Account of it, than I am capable of doing.*

All those Errors and Improvements, which I thought proper to take a particular Notice of, through the whole Course of making broad and narrow Cloth, will be too numerous to mention here.

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vi The P R E F A C E.

I shall be always glad to converse with any Gentlemen of the Trade (who may think it worth their while) in order to satisfy them, with regard to any Objection they may have against what I have at any time advanced. — Likewise I shall be willing to hear any Gentleman's Reasons and Objections, either against the Machine which I have invented for the better regulating Cloth in Milling, or the Observations I have made thereon.

If this plain Machine hath all those good Properties and Excellencies, which I have set forth in the following Observations, the Public will receive the greatest Advantage by it : If it has not, the greatest Loss will be to

Richard Brooks.



OBSERVATIONS
O N
M I L L I N G
Broad and Narrow
CLOTH, &c.

BROAD CLOTH is set in the *Loom*, of different Breadths according to its *Fineness*. CLOTH made of *Spanish Wool*, is generally set between *thirteen* and *fourteen Quarters* wide, in order to its holding when finished, between *six* and *seven Quarters*.

CLOTH made of *English Wool*, is generally set between *twelve* and *thirteen Quarters*, in order to contain *six Quarters*, or sometimes *six and a half*, when finished.

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As to the *Length* of the CLOTHS, they differ very often. They are commonly laid in the *Chain* about *thirty-six Yards*. The *Clothier* expects them from the *Mill* about *twenty-four Yards*.

NARROW CLOTH is much of the same Nature as BROAD CLOTH, according to the various Sorts of it: So that the same Observations in the General, which are proper for the one, are also proper for the other.

NARROW CLOTH can be better struck up in the *Loom* than BROAD CLOTH; wherefore it will not require so much shrinking in the *Mill*.

It is generally observed, that BROAD CLOTH doth shrink from what it was set in the *Loom*, to what it doth contain, when finished, about one *half* of its *Breadth*, and about one *third* of its *Length*. A
small

small Part of this shrinking is in the *Weaving*; it may be about two Nails in its *Breadth*, and about one Yard in its *Length*, if it be sized in the *Chain*; but if it be sized in the *Skain*, it will be as long from the *Loom* as it was from the *Bar*; yet not so wide, as it was set in the *Slay*, by a Nail or two. It will likewise shrink something in *Braying* or *Cleansing* from the *Oil*, *Dying*, &c. The less it shrinks in the *Braying* the better.

After it is *Burled* or *Pick'd* (which is taking out all the *Knots*, *Knibs*, *Linnets*, *Spiles*, &c.) it is then fit for *Milling*, or the GRAND CONTRACTION, which is performed by the *violent Motion* of the *Mill*, and doth soon occasion the CLOTH to *Heat*. It is this *Heat*, with the continual Motion of the *Mill*, which doth contract or shrink the CLOTH.

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I have as yet omitted mentioning the *Soap*, which is used in *milling of CLOTH*; because the *Mill* will prove or shrink the *CLOTH* without it, either with *Oatmeal, Fullers-Earth, Clay, &c.* or sometimes with the *Grease* which is purposely left in the *CLOTH*. Any of these will preserve the *CLOTH* from breaking in the *Mill*, during its shrinking. But *this Method* is mostly used in *Milling* very coarse *CLOTH*.

It is found by Experience, that nothing will preserve the Life of the *Wool* in fine *CLOTH*, and nourish it during this violent Motion of the *Mill* (which may perhaps be continued on a *CLOTH* twenty or twenty-four Hours) so well as *Soap*, which is made with *Olive-Oil*, and is of a rich soft mellow Nature.

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The Method of using the *Soap* is to dissolve it. Suppose the *Soap*, allow'd for a CLOTH, to be *four Pounds*; it must be cut into thin Slices, and to each Pound of *Soap* must be added one Quart of *Water*, in order to dissolve it: Then add three Gallons more of *Water*, which makes four Gallons in the Whole.

Some CLOTHS require less *Water* to the *Soap* than other.

About three Parts of this *Soap* and *Water* must be thrown on the CLOTH before it is put into the *Mill*; the Remainder is to be used as the CLOTH doth require in its *Milling*.

It can't be expected I should at this Time (neither did I intend) to give an Account of every particular incident throughout the whole Course of *Milling* CLOTH: What I shall chiefly aim at is, to prove

that the common and usual Method of *Reading* CLOTH, during its *Milling*, is very *erroneous* and *destructive*; and the very Cause of many *Faults* which are complain'd of after the CLOTH is finished. Likewise I hope to substitute *better Methods*, which will render a CLOTH more perfect from the *Mill*, than any other yet made use of: But first, I think it proper to explain the only Method now used in *Reading* CLOTH, during its being *Mill-ed*, and shew the many *Inconveniences*, and such too as are very destructive, which do arise from it.

After a CLOTH has been in the *Mill* about half an Hour, it will become warm, and be contracted considerably, both in its *Breadth* and *Length*; and it is then time to *read* or *tight* the CLOTH, to prevent its being *Baggy*, *Millwrinkled*, &c.

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The Method of *Reading* is this. After the CLOTH is taken out of the *Stock* or *Mill*, and laid in Folds ; two Men (one at each Side of the CLOTH) standing opposite to each other, with both their Hands take hold of the Outside or *List*, and so *strain* out the CLOTH in its *Breadth* from each other, as hard as they are well able, till they have *readed* it from one End to the other. It is then again put into the *Mill*; the *Millman* will let it now go longer than at first : *He* will parhaps let it go near an Hour, according as the CLOTH is inclined to prove ; and then it must be *readed* the second Time, which is performed after the same Manner as the first. After the CLOTH has been *readed* two or three Times, it will shrink much slower than at first.

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It is not material to give an exact Account, *how much* the CLOTH doth shrink between each *Reading*; nor when it's a proper Time to *read* it, because the Care and Judgment of the *Millman* will direct him: However, the *Millman* doth or ought to measure the CLOTH as often as it is *readed* (but especially after the CLOTH hath been *readed* two or three Times) that he may know if the *Breadth* and *Length* shrink in Proportion to each other. If they do (which is seldom the Case) he has then no occasion to *cast* or *twist* it; consequently he may make a tolerable good CLOTH, after five or six *Readings*, as the CLOTH may require.

We will now suppose a CLOTH not to prove in its Breadth, in Proportion to what it doth in Length (which is often the Case). The
Millman

Millman then is obliged to *cast* or *twist* the CLOTH like a Cable-Rope and so to *Mill* it, in order to keep out the *Length*, and force in the *Breadth* : In this Case, the CLOTH must be frequently new laid in the *Stock*, and *readed* twice as often, as when it is *mill'd* without *Casting* : And let the *Millman* take the best Care he possibly can, it is ten to one but there will be many *baggy* and *millwrinkled* Places in it. Neither will the CLOTH ever appear with so good a Face, or wear so smooth and even, as CLOTH *mill'd* without *Casting*.

We will next examin the CLOTH before mentioned, which was supposed to be *mill'd* without *Casting* : Possibly it hath neither *baggy* or *millwrinkled* Places in it, and may have passed from the *Clothier* as a good CLOTH ; yet notwithstanding all this, I am of Opinion, by a close
 Inspec-

Inspection you will find the Out-fides, or near the *List*, to be much *thinner*, and sometimes three or four Yards *longer* than the *middle Parts* or *Crease*. But as no true Account could be hitherto given of the *Cause*, which occasion'd its being so uneven; nor a *Remedy* found to prevent it; this Fault has been the more contentedly born with, till some *better Method* might be discovered, to render CLOTH more even and perfect.

It is the general Opinion, that the *List* is the Cause of the CLOTHS not proving so thick at the Outfides as it doth at the Middle or Crease. I was of the same Opinion myself, and therefore for a *Trial*, made several CLOTHS, both *broad* and *narrow*, without any *List*; only a small Quantity of *fine white warp Threds*, which I set in the *Chain* about one Inch
and

and an Half from the *Outside* : Notwithstanding, when the CLOTHS were *mill'd* and *readed* in the common Way, they were as long sided, as if they had been with *common List* to them. I then concluded, the *List* could not be the Occasion, that the Outsides of the CLOTHS were *thinner* and *longer* than the middle Parts or Crease, and at the same Time was convinc'd that there must be some other Cause, which occasion'd this unevenness in the CLOTH.

After I had tried many *Experiments*, and had numberless Thoughts about it, at length, I was not only so fortunate as to find out the *Cause* of the CLOTHS being so uneven, but likewise a REMEDY, which will effectually cure it, and make the *Outsides* and *Crease* throughout the CLOTH of a more equal Length and Substance, than

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is possible to be done by the *old Method*.

But before I say any Thing with respect to this REMEDY, I shall beg Leave to make some *Remarks* on the common Method of *Reading*, and then mention some of the *ill Effects*, it has during the several Operations in Dressing, &c. And

First, Of the Remarks on the common Method of *Reading*.

(1). If you were present at the first *Reading*, you would find, that the *Mill* has made the CLOTH, and the *Soap* in it very warm ; it being then just like *thin Leather* wetted in warm Water and Soap, which will easily retch to almost what Degree you please.

You are to consider (as has been before explained) in what Manner the *Millmen* strain the CLOTH every time it is *readed* : You must also consider, what Effect this Straining
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ing has on the CLOTH, that is so easily retched ; and you will then find, that the Outsides of the CLOTH, which each Man has so often strain'd from the other, are more retch'd out, and become *thinner* and *longer* than the middle Parts of the CLOTH, which could not be so much retch'd as the Outsides : Consequently the middle Parts must remain *thicker* and *shorter* than the Outsides. The Truth of this will more evidently appear, and will also serve as a Demonstration, by straining of a *striped* Piece of CLOTH, because the *Stripes* will appear more *curved* near the *Outsides*, where the Motion of *Violence* began, than in the *Middle* where it terminates. Hence it plainly appears, that this Manner of *Reading* is the chief Cause, why the *Outsides* of the CLOTH are not *milled* of equal Substance

and Length with the *middle Parts* or *Crease*.

(2). The common Method of *Reading* never *reads* nor so much as *strains* the CLOTH in its *Length*, or the Way of the *Chain*, but on the contrary, does the *Chain* an Injury by contracting it: For straining the CLOTH out so often, in *Breadth* or *Woof-wise*, must certainly force in the *Chain* faster than it would naturally *mill* in (like the forementioned Piece of Leather, which, if pull'd out one Way will shrink in the other) so that the Threds of the *Chain* and *Woof* can never so truly unite in the Ground of the CLOTH, nor so naturally contract as when they are both *readed* together. But

Second, Of the ill Effects the common Method of *Reading* has, during the several Operations in Dressing, &c,

(1). The

(1). The generality of CLOTH, as has been before observed, is *thinner* near the Outsides than at the middle Parts.

It is well known, the *thin Places* do not require, nor will they bear so much work with the *Handles*, as those Parts which are of better Substance: And it is very difficult for the *Clothworker* not to overwork the *thin Places*, and at the same Time, to let those Parts which are of better Substance, have as much Work as they require.

The Difficulties which arise in the *Shearing* are much the same, and require as great Care in not shearing the *thin Places* so low, as to make them *threddy*, and at the same Time in cutting down the *thicker Parts*, that they may not wear *rough* and *coarse*.

(2). *Racking* the CLOTH is the next ill Effect to be observed. The
Method

Method is known to most People :
But I think it not amiss to explain
it here.

The Fore-Part of the CLOTH is
hook'd on the *Tenters* at the Fore-
End of the *Rack* : The CLOTH is
strain'd out, and the other End is
hook'd on *Tenters* fix'd in a Board
called a *Head*, something longer than
the CLOTH is wide. In the Middle
of the *Head* is a Wheel to receive a
Rope ; one End of which is fix'd
to a Post of the *Rack*, the other is
put thro' the Wheel in order to
strain the CLOTH, with as much
Violence as is wanting, to make
the *middle Parts* of the CLOTH of
equal length with the *Outsides*,
which were longer when it came
from the *Mill*. The *Damage* this
forcible straining doth to the CLOTH
is very considerable : Such as not
only the separating one Thred
from the other, but likewise dis-
placing

placing every Hair in the Threds so closely united in the *Mill*.

(3). The next ill Effect is *book-*
ing the CLOTH on the *Tenters* at
the Top and Bottom of the *Rack*,
in order to set it to its Breadth ;
in doing which, Workmen often
use great Violence to make it ap-
pear true and even. If you con-
sider in what Manner the CLOTH
is strain'd in its Breadth, you will
find the *thinnest Parts*, which are
the Outfides to be mostly affected
by it. And if there should be any
thin and baggy Places in the CLOTH,
the straining out the *Breadth*,
(which must be done) will make
them *thinner* than they were be-
fore. It also frequently happens,
that there are several *thin Places*
across the CLOTH, *viz.* from *List*
to *List*, which are occasioned ei-
ther in the Weaving, or by some
Woof-Yarn spun different from
the

the rest. Hence it is easy to conceive, that all thin Places must suffer *very much* by violently straining the CLOTH, either in its *Length* or *Breadth*.

It would be tedious to mention all the *Damages* and *Inconveniences* which arise from CLOTHS being over-strain'd in the *Rack*: A few may suffice. Such are (1). Opening, and sometimes breaking the Ground of the CLOTH. (2). The raising its Wool almost upright, after so much Labour and Charge to lay it smooth. (3). The sudden shrinking of the CLOTH when it is changing in the Press, which often spoils a Sett of Parchments or Pasteboards (the chief Cause of CLOTHS having wide Creases when press'd). (4). The Disreputation it brings on CLOTH in general by its shrinking after it is made into *Garments*.

It

It is now time to think of a Cure for these Evils which we have so long been complaining of, and have recourse to our forementioned REMEDY, else it will be to little Purpose to have taken so much Pains in this Affair.

No one could be more discouraged than myself. Every Person I conversed with, allow'd that CLOTH would be better if it could be made more true and even, but at the same time positively asserted, that an *Amendment* was *Impracticable*.

The MACHINE, whose *Advantages* and *good Effects* I am about to describe, is a manifest Proof that CLOTH may be produced more true and even, by being *regulated* by it, than it possibly can be without it.

This MACHINE or REGULATOR, appears so very plain and simple, that I need say but little to
D explain

explain its Use, because I think every Part of it doth sufficiently manifest it to any one who has the least Notion of *Milling* and *Reading* CLOTH. It would also be tedious to give a particular Account, in what Manner the CLOTH is regulated throughout the whole Course of its *Milling*, because you may plainly see by the CLOTH's passing thro' the REGULATOR, that all Parts of it are equally *readed* both in Length and Breadth. The *middle Parts* and *List* or *Outsides*, are equally strained to what Degree you please, or the CLOTH doth require.

You may remember what has been said of the first *Reading* a CLOTH by the common Method, concerning its being so very tender, and liable to be retch'd from its natural Evenness, and how that Method strains it in a very irregular

lar Manner through the whole Course of its *Milling*, and what an uneven CLOTH is produc'd by that Means. This REGULATOR therefore not only prevents all *Millwrinkles* and *baggy Places*, &c. but renders a CLOTH true and even in all its Parts. How close will the *Chain* and *Woof* unite together ; never to be retch'd afunder by any Violence whatsoever (unless Covetousness interfere ;) how strong and smooth must the CLOTH wear ; and how much more likely will it be to keep out Rain, I appeal to every considerate Person.

Where this REGULATOR shall be used, there will never need any *Casting* or *Twisting* the CLOTH, because it is in the Power of the *Millmen*, who attend the REGULATOR, either to keep out the *Length* and *Mill* in the

D 2 *Breadth,*

Breadth, or *Mill* in the *Length* and keep out the *Breadth*, as the CLOTH doth require. Thus you see, at every *Reading*, whether the Outfides and Crease are like to be of equal Length: If not, you may alter it either Way, as you see occasion.

By this NEW METHOD, it plainly appears the CLOTH will contract better in its *Breadth*, than it does by the common Way of *Reading*; so that you may put more *Chain* into its *Breadth*; and the CLOTH will consequently come firmer out of the *Mill*.

I am well satisfied by the Experience I have already had of this REGULATOR, that much more of the Wool, which is or appears to be on the CLOTH, will be *milled* into its Ground by THIS than by the *common Method*.

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The CLOTH being now true and even, and of equal Substance, all the Difficulties in *Roughing*, *Dubbing*, *Shearing* and *Pressing* are over. Likewise the Necessity of overstraining the CLOTH on the *Rack* is at an End: The *Rack* also will be of no other use than to dry the CLOTH, that it may be more conveniently Brushed.

It may be objected, That the *Law* obliges the *Clothier* not to have his CLOTH strain'd more than one Yard in a Score from the *Water-Measure*; but I am well satisfied, that a great Part of CLOTH requires more straining than is allow'd by the *Law*, to make the *Middle* and *Outsides* of equal length.

I had like to have omitted taking Notice of such CLOTHS as do not prove in the *Mill*, at the *middle*

dle Parts or *Crease*, so fast as at the *List*. It is a great Evil, but it doth not so frequently happen as the contrary Fault. I will readily allow, it is much better to have a CLOTH two Yards shorter than its *List*, than to have the List but half a Yard too short for the CLOTH — The Cause of CLOTHS being short Listed, arises from the *List-Yarn* being made of *Fell-Wool*, or such *Wool* as is not proper for the Purpose; or else the *Wool* of the CLOTH receiving some Injury in *Dying*, or its being too *old* and *dead* before it was made into CLOTH. I have had no Opportunity, as yet, to put any such CLOTHS into my REGULATOR, neither do I desire it, except only one for a Trial. But I am persuaded, that the REGULATOR will be a great Help to such CLOTHS, if not effectually

tually cure them. However, all Faults of this Nature are better prevented than cured.

As to what has been said in Commendation of this REGULATOR; it is no more then what hath been fully proved to the Satisfaction of many, the most eminent *Gentlemen* concern'd in the SUPERFINE TRADE, as appears by a Certificate annexed, sign'd by as many of them, as have had an Opportunity of seeing the REGULATOR or the *Model* of it.

I make no doubt but this new Method of REGULATING CLOTH, will meet with a general Approbation and Encouragement from all *Clothiers* and others, who wish well to the *Woollen Manufacture*. And I hope it will not be taken for a Breach of Modesty, if I say, that all Sorts of
CLOTH

CLOTH *regulated* by this plain Piece of *Machinery*, will generally be in their intrinsic Value, at least, *Five per Cent.* better than if done in the *common Way*.



T H E



T H E
C E R T I F I C A T E .

WE whose Names are here-
unto subscribed, being very
sensible of the great Damages and
Inconveniencies often arising from
CLOTHS not being *milled* true and
even ; such as **their** being made
thinner and longer at, or near the
Outside or *List*, than in the *middle*
Parts or *Crease* : Likewise it fre-
quently falls out, that a CLOTH is
thinner in different Places, which
we call *Baggy* : It also frequently
happens, that a CLOTH will not
prove or shrink in its *Breadth*, in
Proportion to what it doth in its
Length, which obliges the *Mill-*
man to *cast* or *twist* the CLOTH like

E a *Cable-*

a *Cable-Rope*, and then to *mill* it, in order to force the CLOTH to prove in its *Breadth*, which Method is allowed by all, that understand *Milling*, to be very detrimental to the CLOTH in many Respects; but as there is no other Way yet made use of, that will force the CLOTH to the *Breadth* required, the *Clothier* is obliged to submit to it.

We therefore being willing to recommend and encourage *Industry* and *Ingenuity*, especially such as appears to the Advantage of the *Woollen Manufacture*, do hereby certify, That RICHARD BROOKS, of the *Devizes*, in the County of WILTS, *Clothier*, by much Study, Application, and at a great Expence, hath invented a *Method* intirely new, in *milling* Woollen Goods, that will effectually prevent, not only the abovementioned Damages and Inconveniencies, but many others

thers too numerous to be here inserted, and hath exhibited the same fully to our Satisfaction. This NEW METHOD is plain, and to be performed with Ease, and without any Inconvenience whatever.

*Jer. Awdry,
Am. Awdry,
James Moore,
Thomas Figgins,
John Flower,
Thomas Beaven,
John Stafford,
John Turner,
John Threder,
Samuel Sanger,
Samuel Ratty.*

There too numerous to be here in-
 dented, and hath exhibited the same
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 performed with Ease, and without
 any Inconvenience whatever.

For Actings
 Am. Actings
 James Moore
 Thomas Tiffin
 Thomas Brown
 John Stafford
 John Turner
 John Thacker
 Samuel Sanger
 Samuel Ruggs



